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[Title Of The Invention]

PGA TYPE ELECTRONIC COMPONENT MOUNTING BOARD

[Abstract]

PROBLEM TO BE SOLVED: To provide a high density circuit interconnection having a multiple pin structure formed thereon not by inserting pins into a board like a ceramic board but by connecting the pins with a plastic PGA board while contacting each other without lowering pin junction strength.

SOLUTION: Nail head pins 4 are connected to pin connection pads 3 on the surface 2 of a board through head portions 5 of the pins 4 by solder. A pin fixing plate 6 comprising through holes 8 arranged corresponding to the pins 4, capable of passing axial parts of the pins 4 there through and capable of engaging with the head portions 5 of the pins 4, is bonded to the principal surface 2 of the substrate 1 by passing the axial parts of the pins 4 through the through holes 8 and by engaging the head portions 5 of the pins 4 with the through holes 8. The pins 4 are not inserted into the substrate. Pin junction strength is ensured by engaging the head portions 5 with the through holes 8 of the pin fixing plate 6.

[Claim(s)]

[Claim 1] Two or more pads for junction of a pin for input/output terminals being formed in the principal surface of a substrate made from a plastic, and said pin by which a head makes a nail heading type to this pad having electrical continuity held via the head, and, A pin stationary plate which it corresponded to arrangement of this pin, and was provided with a breakthrough which it comes to form so that a shank of this pin can be penetrated and engagement [head / the] is possible, The PGA base for electronic parts having made a head of through and this pin engage with the breakthrough, and having pasted up a shank of said pin on it in the principal surface of said substrate made from a plastic.

[Claim 2] The PGA base for electronic parts according to claim 1 by which electrical continuity between said pad and a head of said pin is held by soldering or adhesion by electroconductive glue.

[Claim 3] The PGA base for electronic parts according to claim 1 or 2 on which said pin stationary plate has pasted up prepreg as adhesives in the principal surface of said substrate made from a plastic.

[Claim 4] Electrical continuity between said pad and a head of said pin is held by a compression set of an anisotropic conductive adhesion sheet which intervened between the principal surface of said substrate made from a plastic, and said pin stationary plate, and was locally pressurized between said pad and a head of said pin, and. The PGA base for electronic parts according to claim 1 on which said pin stationary plate has pasted up this anisotropic conductive adhesion sheet as adhesives in the principal surface of said substrate made from a plastic.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]this invention relates to the PGA base for electronic parts (a following and PGA board -- or it is also only called a substrate) by which the pin for input/output terminals was formed for a large number in the principal surface of the substrate made from a plastic in the shape of a set-up in detail about the PGA (pin grid array) type base for electronic parts.

[0002]

[Description of the Prior Art]The PGA board is widely used from comparatively sufficient pitch between terminals being securable etc., without enlarging the outside diameter size of a package, even if a terminal number increases since an input/output terminal can be taken out superficially. This substrate is divided roughly into the thing of the ceramic type which consists of ceramics, such as alumina, and the thing of the plastic type which laminates a glass epoxy resin compound board etc.

[0003]Among these, the ceramic type PGA board is easy to multilayer, and can also form easily the beer hall which combines wiring between up-and-down layers. Moreover, a head can also join easily the pin for input/output terminals (only henceforth a pin) to high intensity at the pad for junction of the pin formed in the principal surface of a substrate by dashing the end face of the head and carrying out low attachment of the pin which makes a nail heading type.

[0004]On the other hand, a plastic type PGA board, A resist application, etching, etc. carry out the copper-clad resin boards (glass epoxy resin compound board etc.) which stuck the copper plate on one side, a copper wiring pattern is formed, or a resin board is punched, and it is manufactured by laminating with an epoxy adhesive what formed copper in the porous wall side by plating. By the way, since a plastic type thing has the low heat resistance of a substrate, like a ceramic type, it cannot carry out low attachment of the pin, but becomes low soldering junction of the melting point comparatively. However, as for adhesion (junction) intensity, it is insufficient practically to have made the head into the letter of contact at the pad of the substrate, and just to have soldered the pin with a nail heading type head. In this thing, the adhesion strength of a substrate and a pad (copper foil or coppering) is also as low as one to 2 kgf/mm². From such a thing, it was considered as the structure which forms a breakthrough in a substrate, takes electrical continuity by coppering etc. to the internal surface, and inserts a pin in the breakthrough in the shape of penetration (press fit), or carries out being solder impregnated further after that, and fixes a pin to a substrate with the plastic type PGA board of the general former.

[0005]

[Problem(s) to be Solved by the Invention]As mentioned above, in a PGA board conventional plastic type, since circuit wiring could not be formed over the upper and lower sides of a portion with a pin from the breakthrough for fixing a pin being provided, there was a problem that the density of the part and a circuit (wiring) will become low on the structure. Since there was a pin and it became difficult [leading about of a circuit], there was a problem that the demand of multi-pin-izing thru/or the densification of a pin could not be met enough. To the middle of a substrate is used without making into a breakthrough the hole fixed through a pin, Although there is also a thing of the structure which inserts a pin in the hole (JP,4-105351,A), leading about of the part and circuit which intensity became insufficient in that case easily, and the pin has entered to the middle will be barred.

[0006]This invention employing efficiently the outstanding characteristics (low resistance

wiring, a lower dielectric constant insulator, low cost nature, etc.) which it was made in view of such a problem, and a plastic type substrate has. By realizing structure which can join a pin without moreover causing the fall of bonding strength without inserting a pin into a substrate like a ceramic type substrate. Density of the circuit wiring formed in a substrate is made high, and it sets it as the purpose to provide the PGA base for electronic parts which can meet enough the demand of multi-pin-izing thru/or the densification of a pin.

[0007]

[Means for Solving the Problem]In order to attain the above-mentioned purpose, the PGA base for electronic parts of this invention according to claim 1, two or more pads for junction of a pin for input/output terminals being formed in the principal surface of a substrate made from a plastic, and said pin by which a head makes a nail heading type to this pad having electrical continuity held via the head, and, A pin stationary plate which it corresponded to arrangement of this pin, and was provided with a breakthrough which it comes to form so that a shank of this pin can be penetrated and engagement [head / the] is possible, A head of through and this pin was made to engage with the breakthrough, and a shank of said pin is pasted up on it in the principal surface of said substrate made from a plastic (adherence).

[0008]In said means, although electrical continuity between said pad and a head of said pin is good to hold by soldering or adhesion by electroconductive glue, it is not limited to this. In these means, prepreg (Prepreg) may be pasted up for said pin stationary plate on the principal surface of said substrate made from a plastic as adhesives.

[0009]According to composition of such this invention, electrical continuity between a pad and a head of said pin, While being held by soldering or adhesion by electroconductive glue, have pasted up a pin stationary plate on the principal surface of a substrate, and. Since a head of a pin is engaging with a breakthrough of the pin stationary plate, when pull strength acts on a pin in shaft orientations, a slip off stop operation is made, A pin is provided with high bonding strength -- it can resist, even if it receives external force in a part and a transverse direction (the shaft-radius direction of a pin) which furthermore have the engagement -- in spite of being joined to a substrate in the shape of contact.

[0010]In a means given in above-mentioned claim 1, Hold electrical continuity between said pad and a head of said pin by a compression set of an anisotropic conductive adhesion sheet which intervened between the principal surface of said substrate made from a plastic, and said pin stationary plate, and was locally pressurized between said pad and a head of said pin, and. This anisotropic conductive adhesion sheet may be pasted up for said pin stationary plate on the principal surface of said substrate made from a plastic as adhesives.

[0011]A pin stationary plate holds predetermined electric insulation, intensity, and heat resistance, and glass BT (bismaleimide triazine) resin, glass polyimide, glass phenol resin, and glass BCB should just be illustrated. And in such composite, it can replace with glass (textiles) and paper and organic textiles can also be used. A pin stationary plate is proper thickness and what is necessary is just to design it to proper plane shape in consideration of the construction material, plane shape (size) of a substrate, etc. The breakthrough which a shank of a pin penetrates can make the shank penetrate, and it should just be formed so that engagement is possible, and it can make a head of a pin proper pore shape, such as a circular hole.

[0012]

[Embodiment of the Invention]

With reference to example drawing 1 of the 1st gestalt thru/or drawing 4, the example of the 1st gestalt of operation of this invention is explained. One is the PGA base for electronic parts (package body) which makes plane view and an approximately rectangle and which consists of glass epoxy resin etc. among drawing 1, and in the 1 principal surface (drawing 1 undersurface) 2. Many pads 3 for junction of the pin for input/output terminals (only henceforth a pad) are formed, and although a graphic display is not carried out, this pad 3 is formed so that it may be connected with the IC chip carried by wirebonding via the circuit wiring formed in the section of the substrate 1. And in the end face 5a of that head 5, the pin 4 which makes a nail heading type contacts this pad 3, and is soldered to it, and the electrical continuity of the pad 3 and the pin 4 is held via this solder (layer) 10.

[0013]On the other hand, as it engaged with the undersurface 5b of the head 5 of this pin 4, the principal surface 2 of the substrate 1 is pasted with the adhesives (layer) 7 so that the laminated pin stationary plate 6 may mention later. That is, at this example, by the predetermined arrangement corresponding to arrangement of the pin 4, the pin stationary plate 6 (only henceforth a stationary plate) provided with the breakthrough 8 of a large number with a predetermined inside diameter made the breakthrough 8 penetrate the shank 4a of the pin 4, and has pasted the 1 principal surface 2 of the substrate 1 with the adhesives 7. However, the stationary plate 6 in this example is the sheet metal made of glass epoxy resin formed in the rectangular head slightly smaller than the 1 principal surface 2 of the substrate 1, The inside diameter (diameter) of the breakthrough 8 is formed smaller [it is larger than the outer diameter D1 (0.45 mm) of the shank 4a of the pin 4, and] than the outer diameter D2 (0.7 mm) of the head 5 of the pin 4, and it is set as 0.5 mm in this example. A deer is carried out, and in this example, it is set up so that the head 5 may be engaged 0.1 mm as for a design upper piece side.

[0014]The 4b clings to the wall surface of the breakthrough 8, and the pin 4 used for this example is fixed, when the outer diameter of the shank 4a near the head 5 is swollen a little more greatly than the aperture of the breakthrough 8 and the pin 4 is pressed fit in the breakthrough 8 of the stationary plate 6 (refer to drawing 2). The deer was carried out, and it engaged with the edge surface 8a of the breakthrough 8, and the circumference of the head 5 is further filled up with the adhesives 7 filled up with and solidified, and the undersurface (flange of a head) 5b of the head 5 of the pin 4 holds the pin 4, and it has pasted up the stationary plate 6 on the substrate 1. By this example, many filling holes 9 of the adhesives 7 are established in the stationary plate 6 independently [the breakthrough 8 of the pin 4].

[0015]One process of this example shown in drawing 1 and drawing 2 here is explained with reference to drawing 3 and drawing 4. First, specified quantity (prescribed thickness) printing of the solder cream (for example, Sn/Pb=90/10) 10 is carried out at many pads 3 and 3 of the predetermined size formed in the 1 principal surface 2 of the substrate 1. On the other hand, the above-mentioned stationary plate (resin board) 6 is prepared separately, it bundles up with a press and the pin 4 is pressed fit in it until the head 5 engages with the predetermined breakthrough 8 (refer to drawing 3). Subsequently, it positions and this stationary plate 6 in which the pin 4 was pressed fit is made to contact so that the end face 5a of the head 5 of each pin 4 may meet each pad 3 of the substrate 1 as shown in drawing 4. and the bottom of prescribed temperature (200-300 **) -- for example, it heats for 30

seconds, and a reflow of the solder cream 10 is carried out, and cooling solidification is carried out. As a result, the pin 4 is soldered to the pad 3 and electrical continuity is held. [0016] And although the minute gap k produces between the principal surface 2 of the substrate 1, and the stationary plate 6 after this soldering, this gap k is poured in and (press fit) filled up with thermosetting adhesive, such as an epoxy resin, as adhesives from the filling hole 9 formed in the crevice or the stationary plate 6 of an outer edge section of the substrate 1 and the stationary plate 6. In the case of this restoration, it is filled up until excessive resin comes out from the outer edge section and another filling hole 9 of the substrate 1. After an appropriate time, predetermined time (it is about 5 hours at about 24-hour or 150 degrees C in ordinary temperature) heating is carried out under prescribed temperature, adhesives are stiffened, and the stationary plate 6 is pasted up on the principal surface 2 of the substrate 1.

[0017] Although formed like drawing 1 and drawing 2 in this way, since the neighborhood of a periphery of the head 5 of the pin 4 is hardened by adhesion of this stationary plate 6 with the adhesives 7 and the undersurface 5b of the head 5 of the pin 4 engages with the edge surface 8a of the breakthrough 8 by it, the bonding strength of a pin just with insufficient soldering is also held highly. Incidentally, according to the tensile test of the pin, only in soldering, the end face (soldering part) of the head of a pin dissociated from the pad by about 2-3 kgf, but the pin was cut in the middle of the shank by 8 or more kgf, without producing such separation in this example.

[0018] Thus, in this example, though it is a PGA package made from a plastic, Since it joins by the letter of contact and wiring can be taken about inside the section like a ceramic type PGA board, without making the pin 4 into the letter of penetration thru/or the letter of insertion at the substrate 1, the densification and multi-pin-izing of wiring comparable as it can be attained.

[0019] The thing of the above-mentioned structure can be manufactured even if it does not press a pin fit in a stationary plate beforehand (refer to drawing 5 thru/or drawing 7). That is, using the predetermined jig, first, it contacts, the end face of the head 5 is held in the set-up state, a reflow of the pin 4 is carried out to spreading of the solder cream 10, and the formed pad 3, and it joins to it (refer to drawing 5). And as the adhesives 17, such as an epoxy resin, are applied to the principal surface 2 side (drawing 6 upper surface) of the substrate 1 to which the pin 4 was joined and it was shown in drawing 6 after an appropriate time, What is necessary is to stiffen the adhesives 17 and just to paste them up by putting the stationary plate 6 on the breakthrough 8 through the pin 4 in the principal surface 2 of the substrate 1, suppressing the stationary plate 6 by the predetermined load W, as shown in drawing 7, and carrying out predetermined time heating with prescribed temperature under it. According to such a process, since there is no stationary plate when the pin 4 is joined (state of drawing 5) (soldering), washing of flux becomes easy. Adhesives may be applied to a stationary plate in this process.

[0020] A solder clad may be formed in the end face of the head 5 of the pin 4 although solder cream was formed on the pad 3 of the substrate 1 in the above-mentioned process for junction (soldering) of a pin. Electrical continuity is just held, therefore the junction to the head of a pin and a pad may be replaced with solder, and may apply to a pad the Au-Sn paste which can be mostly welded to this on the same conditions. Since electrical continuity should just be held, it replaces with these, and after applying conductive (resin) adhesives to the end face of a pad top or the head of a pin, it may paste up.

[0021]If electroconductive glue is used for maintenance of the electrical continuity of a pad and a pin, it can paste up by holding, for example at 150 degrees C for about 1 hour, but the thing in which the curing temperature is lower than the heat-resistant temperature of electroconductive glue is used for the adhesives of a stationary plate. Since a reflow process becomes unnecessary unlike soldering etc. when electroconductive glue is used, manufacture becomes easy. Even when using electroconductive glue, it joins to a pad (a flow is held), the pin is beforehand pressed fit in the stationary plate, the same with having described above, from a filling hole etc., it may be filled up with adhesives and may paste up, and after joining a pin to a pad (a flow is held), a stationary plate may be pasted up later. namely, the PGA board concerning this invention -- electrical continuity should just be held and the pin and pad to kick are not limited to adhesion by soldering or electroconductive glue.

[0022]In the PGA board of the above-mentioned structure, the prepreg (board which impregnates with an epoxy resin etc. and carries out semi-hardening to glass-fabrics textiles etc.) which equipped with the breakthrough (an aperture -- the path of the head of a pin -- abbreviated -- the same thing) corresponding to arrangement of a pin the adhesion means (adhesives) which pastes up a stationary plate on a substrate can also be used.

[0023]Here, the process at the time of using prepreg is explained with reference to drawing 8 thru/or drawing 11. The 1st example pastes up the pin 4 on the pad 3 of the substrate 1 with soldering or the electroconductive glue 10 first as mentioned above. Subsequently, as shown in drawing 8, it has by predetermined thickness (for example, 50-100 micrometers), The prepreg 27 which equipped the position corresponding to arrangement of the pin 4 with the breakthrough 28 the path of the head 5 of the pin 4, and of approximately the same diameter like the stationary plate 6, Make it intervene between the substrate 1 and the above stationary plates 6, and the breakthrough 28 of the prepreg 27 and the breakthrough 8 of the stationary plate 6 are made to meet so that the pin 4 may be suited, and the stationary plate 6 is pasted together to the principal surface 2 of the substrate 1 through the pin 4 under it (refer to drawing 9). And it pressurizes under prescribed temperature (150-200 degrees C) by predetermined time (1.5 to 2.5 hours), and a predetermined pressure (20-70kgf/cm²), and the prepreg 27 is stiffened. By doing in this way, the substrate 1 and the stationary plate 6 paste up the prepreg 27 as adhesives, and the pin 4 is fixed after the head 5 has engaged with the edge surface of the breakthrough 28 of the stationary plate 6. The filling hole 9 of the stationary plate 6 becomes unnecessary when based on the application-of-pressure adhesion by a vacuum press.

[0024]In this process, although the stationary plate 6 other than the prepreg 27 was used, When it is joined to the substrate side and prepreg hardens, and the head of a pin is engaged and it enables it to hold immobilization (bonding strength) of a pin by it by making the breakthrough 28 smaller than the path of the head 5 of a pin, an independent stationary plate is not required separately. That is, it is because itself becomes a stationary plate after junction of prepreg, and solidification.

[0025]Now, next, the 2nd process at the time of using prepreg is explained with reference to drawing 10 and drawing 11. While this method bundles up the pin 4 to the breakthrough 8 of the stationary plate 6 and inserts it in it to that head 5, without joining the pin to the pad 3 of the substrate 1 beforehand (press fit), it fills up with the electroconductive glue 30 the breakthrough 28 for pins formed in the prepreg 27, or embeds it. And as shown in drawing 11, the stationary plate 6 which inserts the pin 4 is doubled via the prepreg 27, as

the head 5 of the pin 4 corresponds to the part and the pad 3 of the electroconductive glue 30 which were filled up by the breakthrough of prepreg. And under prescribed temperature, it is stuck by pressure by the predetermined load W, and prepreg and electroconductive glue are stiffened. Then, between the pad 3 and the heads 5 of the pin 4 pastes up with the electroconductive glue 30, and electrical continuity is held. And between the principal surface 2 of the substrate 1 and the stationary plates 6 pastes up by the prepreg 27, the head 5 of the pin 4 is engaged and fixed to the edge surface of the breakthrough of the stationary plate 6, and the structure considered as the request same with having been shown in drawing 9 can be acquired.

[0026]Electrical continuity should just be held and what is necessary is just to set suitably the size of the breakthrough 28 of the prepreg 27, the quantity of the electroconductive glue 30 to embed, etc. to the pad 3 and the pin 4 which meet after adhesion, after other electric insulation is secured. Therefore, it may use the same with it having been smaller than the path of the pin head 5, having made larger than the path of a shank the size of the breakthrough 28 provided in the prepreg 27, and having described it above. In this case, the prepreg 27 changes and hardens by making the construction material and thickness of the prepreg 27 suitable. Therefore, the stationary plate 6 pastes them up on the principal surface 2 of the substrate 1, the edge surface 8a of the breakthrough of the stationary plate 6 and the head 5 of a pin being engaged via this prepreg 27.

[0027]Although the pad 3 and the pin 4 all showed what joined with solder, electroconductive glue, etc. and held electrical continuity in the above-mentioned example, While making the pad 3 and the head 5 of the pin 4 stick and holding both electrical continuity, both bonding strength may be made to be obtained when the head 5 of the pin 4 engages with the stationary plate 6. When the end face 5a of the head 5 of a pin is made into a split face or unevenness of a knurl, opium poppy, conical shape, etc. is provided, it becomes easy to hold electrical continuity with the electroconductive glue 30 or the pad 3, and is desirable.

[0028]The example of the 2nd gestalt, next the example of the 2nd gestalt concerning this invention are explained with reference to drawing 12 thru/or drawing 13. This example making the anisotropic conductive adhesion sheet 37 of the fixed thickness (for example, about 15-25 micrometers) which flows only through the part which required the pressure up and down intervene between the principal surface 2 of the substrate 1 made from a plastic, and the stationary plate 6, and taking electrical continuity between the pad 3 and the head 5 of the pin 4. The substrate 1 and the stationary plate 6 are pasted up.

[0029]It makes the head 5 of the pin 4, and the pad 3 of the substrate 1 meet it, makes it, and the thing of this example of a gestalt positions the stationary plate 6 which penetrates the pin 4, and makes the anisotropic conductive adhesion sheet 37 intervene between them (refer to drawing 13). And between the principal surface 2 of the substrate 1, and the stationary plate 6, predetermined time and the predetermined load (compressive force) W can be added under a predetermined temperature (for example, 150 degrees C - 200 degrees C, 20 seconds, 1 - 3Mpa), and it can obtain by sticking the substrate 1 and the stationary plate 6 by pressure. In this example, the part and the anisotropic conductive adhesion sheet 37 with the thickness of the head 5 of the pin 4, and the thickness of the pad 3 from it being strongly pressurized locally in this part, and causing a compression set. It is insulated from not receiving a big pressure relatively, and the part where the pad 3 and the pin 4 of the pad 3 and five head of a pin are not while electrical continuity is obtained

via the electric conduction particles in the adhesion sheet 37 functions only as a glue line. [0030]In this example, since maintenance of electrical continuity and adhesion of the stationary plate 6 to the substrate 1 require only the anisotropic conductive adhesion sheet 37, without requiring a soldering process, simplification of structure can be attained.

[0031]

[Effect of the Invention]Employing efficiently the outstanding characteristics (low resistance wiring, a lower dielectric constant insulator, low cost nature, etc.) which a plastic type substrate has according to this invention. Structure which can join a pin can be realized without moreover causing the fall of bonding strength without inserting a pin into a substrate like a ceramic type substrate. Therefore, though it is the plastic type PGA base for electronic parts, density of the circuit wiring formed in a substrate can be made high, and multi-pin-izing thru/or densification of a pin can be attained.

[Brief Description of the Drawings]

[Drawing 1]The central vertical section front view showing the example of the 1st gestalt of operation of the PGA base for electronic parts concerning this invention.

[Drawing 2]The important section expanded sectional view of drawing 1.

[Drawing 3]The central vertical section front view which is an explanatory view of the manufacturing process of the PGA base for electronic parts of drawing 1, presses a pin fit in a pin stationary plate and is made to meet the pad of a substrate.

[Drawing 4]The central vertical section front view in the state where the head of the pin was soldered to the pad of the substrate after the process shown in drawing 3.

[Drawing 5]The central vertical section front view in the state where are an explanatory view of another process of the PGA base for electronic parts of drawing 1, and the pin was soldered to the pad of the substrate via the head.

[Drawing 6]The central vertical section front view explaining the state of applying adhesives to the principal surface side of a substrate after the process shown in drawing 5, and putting a stationary plate on the breakthrough through a pin in the principal surface of a substrate.

[Drawing 7]The central vertical section front view in the state where the stationary plate was pasted up on the principal surface of the substrate in the process shown in drawing 6.

[Drawing 8]The central vertical section front view in the state of explaining the process of the case using prepgs to the adhesion means which pastes up a pin stationary plate on a substrate and that are a figure, paste up a pin on the pad of a substrate, make prepg intervene between a substrate and a stationary plate, and alignment is carried out.

[Drawing 9]The central vertical section front view in the state where the pin stationary plate was pasted up on the substrate after the process shown in drawing 8.

[Drawing 10]The central vertical section front view in the state where the pin stationary plate which is a figure explaining another process of the case using prepgs, and pressed the pin fit in the adhesion means which pastes up a pin stationary plate on a substrate is changed into the substrate and the confrontation state via prepg.

[Drawing 11]The central vertical section front view in the state where the pin stationary plate which pressed the pin fit after the process shown in drawing 10 was made to contact a substrate.

[Drawing 12]The central vertical section front view of what used the anisotropic conductive adhesion sheet for the adhesion means which shows the example of the 2nd gestalt of operation of the PGA base for electronic parts concerning this invention, and

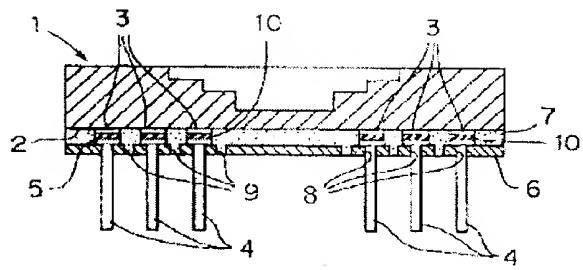
pastes up maintenance and the pin stationary plate of the electrical continuity of a pin and a pad on a substrate.

[Drawing 13]The central vertical section front view in the state where the anisotropic conductive adhesion sheet is made to intervene between the pin stationary plate and pad which are the explanatory views of the manufacturing process of the PGA base for electronic parts of drawing 12, and pressed the pin fit.

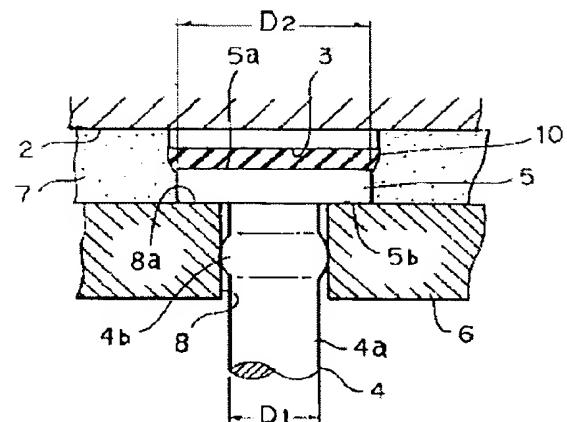
[Description of Notations]

- 1 The substrate made from a plastic
- 2 The principal surface of a substrate
- 3 Pad
- 4 The pin for input/output terminals
- 4a The shank of the pin for input/output terminals
- 5 The head of the pin for input/output terminals
- 6 Pin stationary plate
- 7 and 17 Adhesives
- 8 The breakthrough of a pin stationary plate
- 27 Prepreg (adhesives)
- 37 Anisotropic conductive adhesion sheet (adhesives)

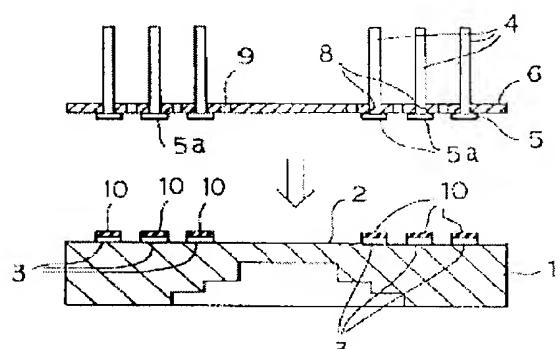
【図1】



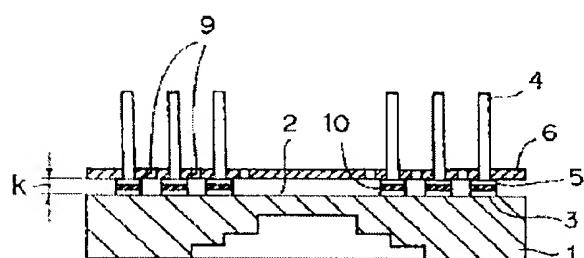
【図2】



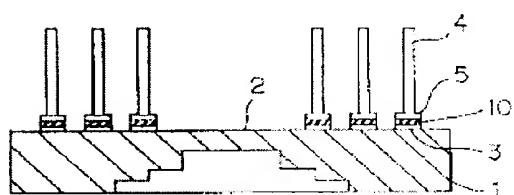
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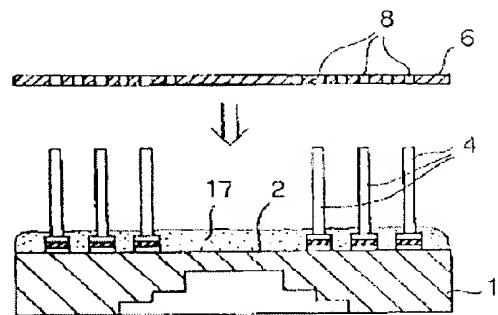
【図4】



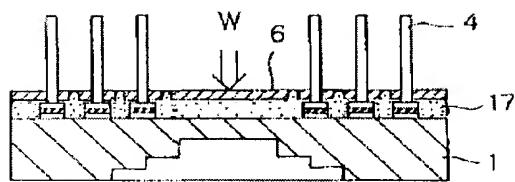
【図5】



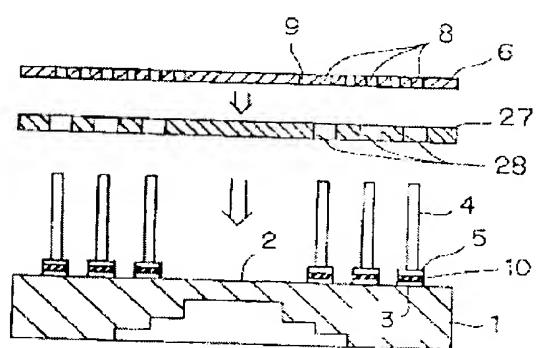
【図6】



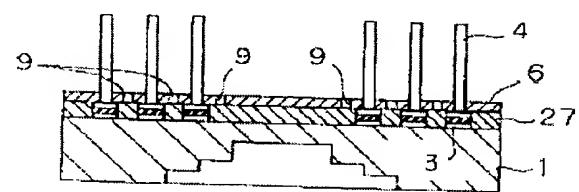
【図7】



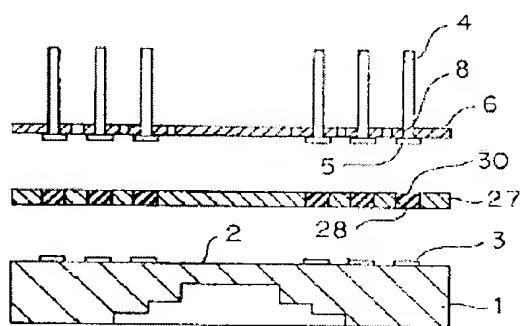
【図8】



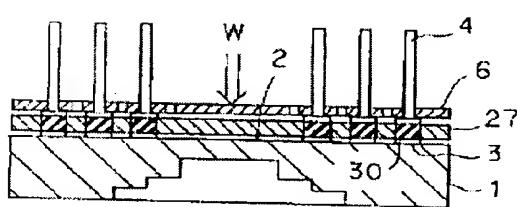
【図9】



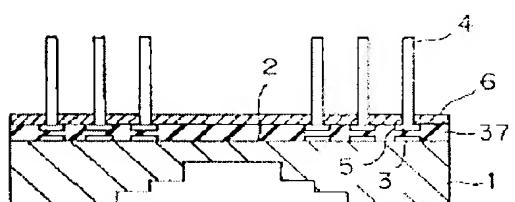
【図10】



【図11】



【図12】



【図13】

